The Analysis of Cation-Anion Difference of Six Important Forage

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Introduction The high performance and fitness of dairy cow relies on high quality forage . The difference between cation and anion in forage means cation-anion difference (CAD) , which has close relationship with some disease occurs in late perinatal period such as milk fever . The amount of sodium and potassium minus that of chloride and sulfur will be CAD . To prevent milk fever , using anion salt which contain chloride or sulfur in early perinatal period is feasible (Tucker et al . ,1991) . But the platability of anion salt is bad , and the price of anion salt is high . Forage usually have higher CAD than anion salt , but forage is more cheap , so feed forage with low CAD to dairy cow in early perinatal period will be benefit to prevent milk fever .

Material and method Six forage samples are collected in Beijing on june 2006 . They are dried at 65℃ with 48h , and then measured the content of sodium , potassium , chloride , sulfur . CAD is calculated follow the formula as below .
$CAD=(Na^{+}+K^{+})-(Cl^{-}+S^{2-})=$(percentage of $Na^{+}\times10000/23+$percentage of $K^{+}\times10000/39$)-(percentage of $Cl^{-}\times10000/35.5+$percentage of $S^{2-}\times10000\times2/32$) .

Result and discussion The content of sodium varies most among forage samples , the next is potassium and sulfur , chloride is the most stable . The content of potassium is the highest , the next is chloride , sulfur and sodium (table 1) . The content of potassium influence CAD mostly . The CAD of alfalfa in early bloom and Kura clover(*Trifolium ambiguum*) in vegetative stage are negative , and can be used to feed dairy cow in early perinatal period . Although tall fescue is usually used to establish turf in China , it is also a good forage with low CAD to feed dairy cow .

Table 1 *CAD of some important forage .*

Sample	Na^{+} (%DM)	K^{+} (%DM)	Cl^{-} (%DM)	S^{2-} (%DM)	CAD(meq/kgDM)
Tall fescue(heading stage)	0 .25	2 .02	1 .23	0 .33	74
Smooth brome(heading stage)	0 .06	2 .97	1 .23	0 .28	221
Alfalfa(early bloom)	0 .08	2 .22	1 .20	0 .49	-40
Orchard grass(heading stage)	0 .05	3 .82	1 .22	0 .35	439
Kura clover(vegetative stage)	0 .05	1 .95	1 .20	0 .33	-23
White clover(early bloom)	0 .21	2 .25	1 .23	0 .25	165

Conclusion In order to keep the fitness of dairy cow , the primary ingredient of diet in early perinatal period should be forage with low CAD .

Reference

Tucker , W . B . , Hogue , J . F . , Waterman , D . F . , Swenson , T . S . , Xin , Z . , Hemken , R . W . , Jackson , J . A . , Adams , G . D . , and Spicer , L . J . , 1991 . Role of sulfur and chloride in the dietary cation-anion balance equation for lactating dairy cattle . J . *Anim . Sci* . 69 ,1205-1213 .